REMARKS

This application has been amended in a manner believed to place it in condition for allowance at the time of the next Official Action.

Claim 5 is amended to include the features of claim 2. Accordingly, claims 2 and 17 are cancelled.

Claims 19-21 are new, and recite the same features of claim 2, but depend from independent claims 6, 9 and 13, respectively.

Support for the amended and new claims may be found, for example, at specification page 10, lines 8-23.

Claims 5, 6, 9, and 13-21 remain pending in the application.

It is believed that the amendment would require further consideration and/or search due to the new combination of features in claim 5, as well as the new features that are dependent on claims 6, 9 and 13.

Claims 2, 5, 6, and 9 stand rejected under 35 USC §103(a) for being unpatentable over CARBO et al. U.S. 4,507,339 (CARBO) in view of UCHIDA et al. U.S. 4,248, 676 (UCHIDA). This rejection is respectfully traversed.

As discussed above, claim 2 is cancelled.

Claim 5, and new claims 19 and 20, recite the features of claim 2.

The positions maintained are specifically directed to the surface roughness, the filled pin holes in the passivation film, and the film structure resulting form coating/heating/oxidizing as claimed. These positions are addressed below:

I. The surface roughness.

The position maintained, as further discussed in the Advisory Action of July 8, 2008, is that the surface roughness of the metallic surface would have been an obvious result effective variable with regard to the adherence of the coating. The position held is that it is well known that surface roughness effects bonding strength, and that one of ordinary skill in the art would have been motivated by UCHIDA to have a surface roughness of 0.8-3μm in order to achieve a metallic matte surface.

However, there is no suggestion that "a surface roughness (Ra) being not more than 1.5μm" would have been preferred. Indeed, CARBO discloses that it is reactive groups liberated from an applied lubricant provides adherence of a coating. See, e.g., the paragraph bridging columns 3 and 4.

Moreover, CARBO implicitly teaches away from utilizing a matte surface treatment on a *steel* substrate, as taught by UCHIDA.

CARBO is directed to solving the problem coating a metal surface, but focuses on a solution for a *steel* substrate. CARBO discloses, however, that for a tin substrate, a matte surface treatment is part of the solution. See, e.g., the paragraph bridging columns 4 and 5. Thus, as UCHIDA discloses a matte finish for a *steel* substrate, UCHIDA is contrary to the teachings of CARBO, which solely suggests a matte finish for tin substrates, not steel substrates.

II. The filled pin hole feature.

The position maintained is that it would have obvious to fill pin holes in the passivation film of CARBO in order to prevent crack formation in view of UCHIDA.

However, there is no recognition by either publication of any type of holes in the passivation film of CARBO.

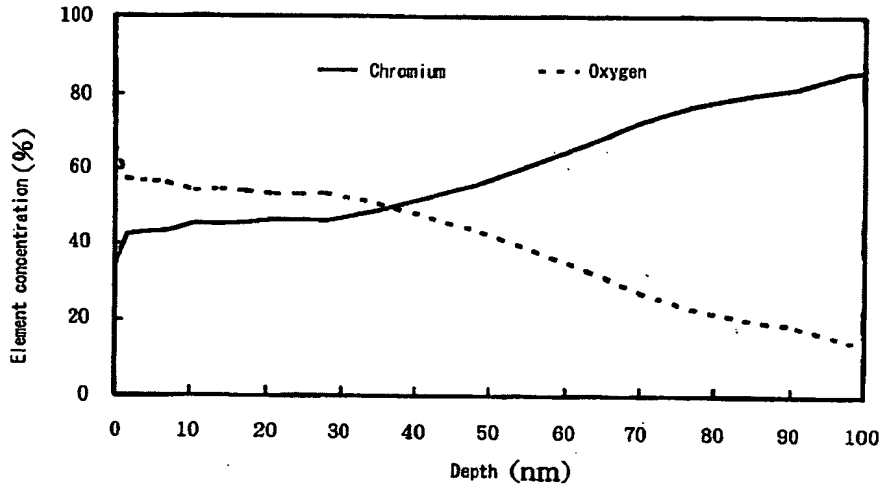
CARBO does not disclose pin holes in the chromium/chromium oxide layer.

Not only does UCHIDA fail to disclose or suggest that the chromium/chromium oxide layer of CARBO includes pin holes, but UCHIDA fails to recognize a problem of pin holes of a chromium-oxide passivation film. To the contrary, UCHIDA suggests that there are no pin holes in oxidized chromium films, as UCHIDA fills pin holes of other types of film, such as chromium films, using chromate films.

Thus, the combination cannot teach that pin holes in the chromium-oxide passivation film are sealed, as recited in independent claim 5, and new dependent claims 19-21.

III. The film formed by the claimed process steps.

An exemplified film structure resulting from "heating a chromium film coated directly onto the metallic material surface in an oxidizing atmosphere" is illustrated by Figure 2 of the present application, shown below:



In the illustrated example, up to about 30 nm from the outermost surface of the coated chromium film contains 40% chromium and 60% oxygen after oxidation, i.e., up to about 30 nm from the outermost surface the oxidized film is Cr_2O_3. The depth of the Cr_2O_3 depends on process parameters, e.g., the heating time.

Thus, "heating a chromium film coated directly onto the metallic material surface in an oxidizing atmosphere" results in

not only a film having a Cr_2O_3 layer up to a certain distance from the outermost surface, e.g., about 30 nm, but a film also including both Cr and O between the Cr_2O_3 layer and the metal material surface.

This resulting structure is neither taught nor suggested by the proposed combination of CARBO and UCHIDA.

Indeed, CARBO specifies an overall concentration of chromium/chromium oxide applied to a metal surface, not a particular depth of the chromium oxide. This does not suggest the same structure that would result from heat treating a chromium coated film metal surface in an oxidizing atmosphere, e.g., as illustrated above in Figure 2 with both chromium and oxygen are present in a film beneath the chromium oxide layer.

UCHIDA discloses a chromium oxide and/or chromium film applied directly to a first chromium layer to a metal surface. Beyond the chromate layer there is either (i) the steel substrate or (ii) a chromium layer. See, e.g., the figures of UCHIDA.

There is no suggestion in UCHIDA of a chromium oxide layer at the other most surface, and both chromium and oxygen are present together in the film between that layer and the surface of the metal substrate, which results from heat treating a chromium coated film metal surface in an oxidizing atmosphere.

Thus, the proposed combination cannot teach, or even suggest, the structure which results from the claimed chromium oxide formation feature.

Therefore, in view of the above, the proposed combination fails to render obvious claims 5, 6, 9, 14-16, and 18-20, and withdrawal of the rejection is respectfully requested.

Claim 13 stands rejected under 35 USC §103(a) for being unpatentable over CARBO in view of UCHIDA, further in view of OHMI U.S. 5,656,099. This rejection is respectfully traversed.

For the reasons discussed above, the publications, alone or in combination, fail to teach the claimed surface roughness, the chromium oxide passivation film, and the process of forming the film.

OHMI discloses the formation of chromium-oxide through the treatment of chromium already present in stainless steel with less-oxidative gas (mainly hydrogen) in a certain condition. If the processes and conditions are correctly prepared, impurities will be generated in chromium-oxide. That is, chromium diffuses to the surface, along with iron, resulting in the formation of both iron oxide and chromium oxide.

The film of the claimed invention, however, is formed having a 100% oxidized chromium on the surface as a result of the chromium being coated directly over the metallic material and annealed by oxidation gas, e.g., as demonstrated by Figure 2 discussed above. As a result, the thickness of the film is increased due to the diffusion of the chromium or the oxygen after the formation of the chromium oxide film. The oxides other than chromium oxides, such as iron oxide, do not essentially

exist near the interface between the metallic material and the passivation film in the claimed invention.

Thus, OHMI cannot suggest the resulting film structure as claimed, and OHMI cannot remedy the shortcomings of CARBO and UCHIDA for reference purpose.

Therefore, the proposed combination fails to render obvious claim 13 and new claim 21, and withdrawal of the rejection is respectfully requested.

In view of the amendment to the claims and the forgoing remarks, applicants believe that the present application is in condition for allowance at the time of the next Official Action. Allowance and passage to issue on that basis is respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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